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FLOOD INSURANCE STUDY

SCOTT COUNTY, MISSOURI

UNINCORPORATED AREAS

ORIGINAL

APRIL 3, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 290837

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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Flood Insurance Rate Map

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FLOOD INSURANCE STUDY

SCOTT COUNTY,
UNINCORPORATED AREAS,
MISSOURI

1 0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Scott County, Missouri, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE) (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-E-0941, Project Order No. 14. This study was completed in October 1984.

1.3 Coordination

Community base map selection and the identification of streams requiring detailed study were made in a meeting attended by personnel of the Study Contractor, FEMA, and officials representing Scott County in August 1982.

Various Federal, state, and private agencies were contacted for pertinent information.

On December 5, 1985, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

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2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Scott County, Missouri. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the county were excluded from this study.

Flooding caused by overflow of the Mississippi River within the corporate limits; North Cut Ditch, from the southern county boundary to just downstream of County Highway D; St. John's Bayou Main Ditch, from the northern corporate limits of the City of Sikeston to about 2.9 miles upstream of County Highway HH; Ditch No. 1, from the southern county boundary to about 0.5 mile upstream of County Highway ZZ; Ditch No. 2, from the southern county boundary to about 0.5 mile upstream of County Highway ZZ; Ditch No. 4, from the northern corporate limits of the City of Sikeston to about 0.5 mile upstream of County Highway ZZ; Ramsey Creek Diversion Channel, from the northern corporate limits of the City of Scott City to the Burlington Northern railroad; and Ramsey Creek, from the Burlington Northern railroad to the confluence of Ramsey Creek was studied by detailed methods.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through October 1989. County officials felt that the area of Scott County with the most potential for development within the next five years was in the southern portion of the county in the vicinity of the City of Sikeston. The scope and methods of study were proposed to and agreed upon by FEMA and Scott County.

2.2 Community Description

Scott County is bordered by Cape Girardeau County on the north, Stoddard County on the west, and New Madrid and Mississippi Counties on the south. Alexander County, Illinois, lies east across the Mississippi River. In 1980, Scott County had a population of 39,647, which represented a 19.2 percent increase from the 1970 population of 33,250 (Reference 1).

Scott County, the second county formed in Missouri's famed Southeast Lowland Region, was organized in 1821 and named for John Scott, the state's first Congressman.

Cotton, soybean, melon, and grain are produced in Scott County. The county lies between the Mississippi and the Little River District drainage ditches, one of the largest drainage systems in the U.S., established in 1905. Crowley's Ridge, remnant of an old coastal plain, crosses the county.

The county exhibits both basic topographic areas of the Bootheel Region. Most of the county is lowland. However, Crowley's Ridge (known locally as the Scott County or Benton Hills) extends across northern Scott County.

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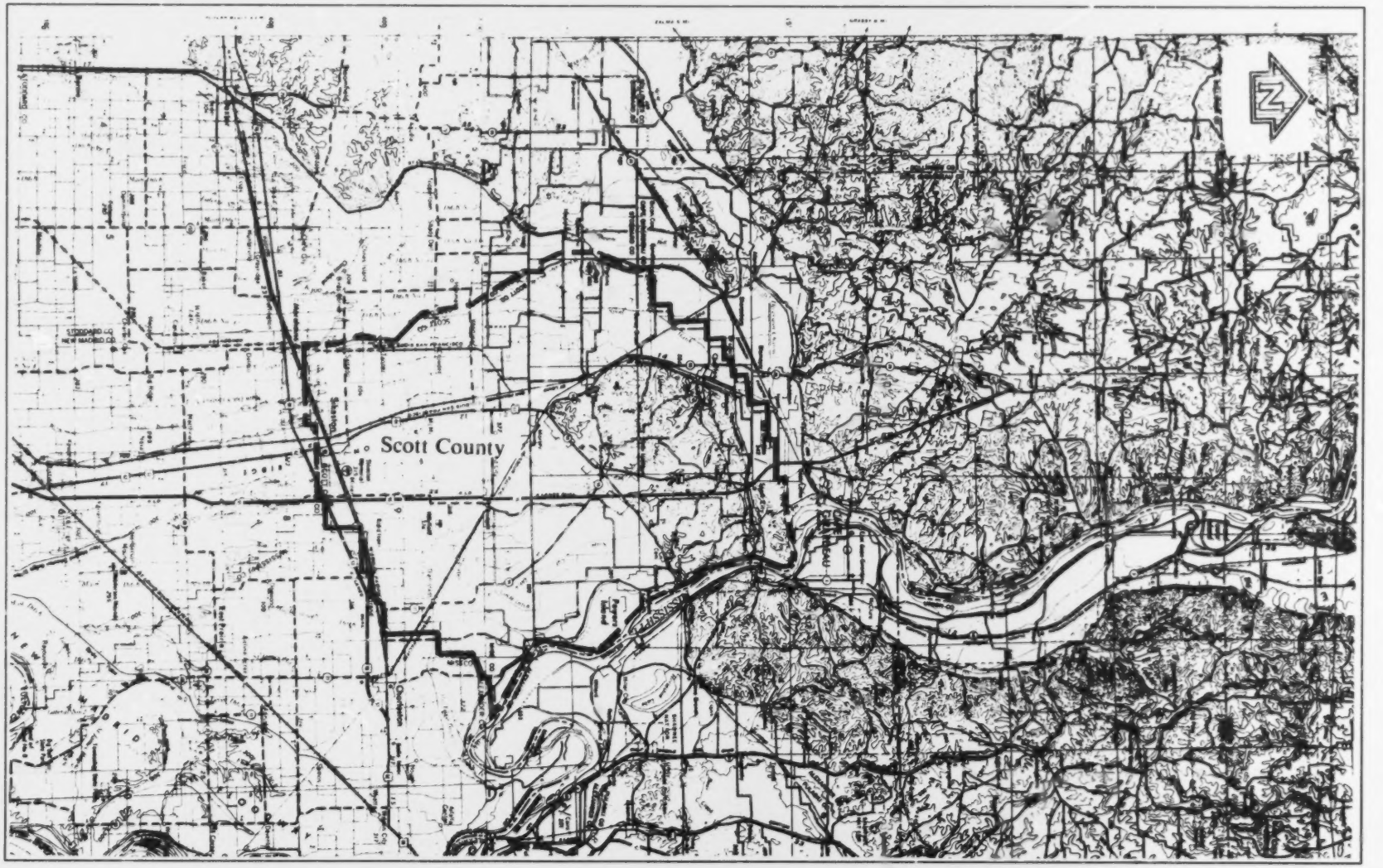

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOTT COUNTY, MO

(UNINCORPORATED AREAS)

APPROXIMATE SCALE

8 0 8 16 24 MILE

VICINITY MAP

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Rolling hills and steep slopes are located in this geologic land form. Compared to the total land area of the county, the amount of land in the steep slope category is relatively small. Steep slopes do limit urban development and in many cases preclude normal farming practices. Most of the steep slope land has a low level of fertility and is covered with native timber.

Most of the land slopes on Crowley's Ridge are classified as rolling hills. Where slopes are gentle to moderate, the land is generally used for row crops. In areas where slopes are moderate to severe, the land generally is used for pasture. Rolling hills do not restrict urban development. The Sikeston Ridge is another topographic feature of Scott County. The Sikeston Ridge is a level, sandy terrace marked by steep slopes, indicating that it was formed by stream erosion occurring when major rivers once coursed the plain.

Climatic conditions typifying the mid-south regions of the United States are present in Scott County. Summers are warm and humid, while the winters are mild with sparse snowfall. The average annual mean temperature is about 56 degrees Fahrenheit. Average annual precipitation is about 46 inches.

Most of the unincorporated areas of the county are used for agricultural purposes and development is limited to isolated residential areas within the flood plain.

2.3 Principal Flood Problems

Major flooding from the Mississippi River generally occurs in the spring and early summer months and is usually caused by melting snow and extensive rainfall over the watershed.

Flooding in the study region is closely related to the flat topography and the influence of the Mississippi River. Flooding on the reach of the upper Mississippi River immediately above the confluence of the Ohio River is influenced by floodflows from the Ohio River and the resulting backwater effects from the Lower Mississippi River. Backwater conditions on both the Mississippi River and the Little River Diversion Channel create an inadequate outlet for drainage, compounding the flooding in the area. Ditches draining into the Mississippi River are directly impacted by the effects of backwater. The areas around the Cities of Commerce and Scott City, Missouri, are also affected by high stages on the Mississippi River. Since there is not an adequate outlet for surface water, water will pond in several areas. The high water table in the region, which fluctuates with the Mississippi River stages, further aggravates this problem.

The relatively flat slope of the drainage ditches also aggravates the problem. The water is not able to flow fast enough in the channels during extreme rainfalls, causing an overbank sheet flow problem.

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2.4 Flood Protection Measures

Portions of Scott County are protected from the 100-year flood event on the Mississippi River by levees associated with Levee District No. 2 of Scott County. These levees run from the Scott-Mississippi County line to a point immediately south of Commerce. There is no flood protection for the other ditches that provide drainage in the study area.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

There are no streamflow records for the ditches in the Scott County area that can be used to define historical discharge-frequency relationships. The 100-year rainfall frequency data were developed from Technical Paper No. 40 (Reference 2). The discharge-frequency relationship was then developed by a frequency rainfall analysis using the COE Flood Hydrograph Package (Reference 3).

The excess rainfall that is converted into runoff was determined by applying initial and uniform loss rates that are typical for similar regions.

Discharges for the Mississippi River were determined by using data from various gaging stations on the Mississippi River and by following the guidelines in U.S. Water Resources Council Bulletin No. 17 (References 4 and 5).

Peak discharges for the 10-, 50-, and 100-year floods of each flooding source studied in detail in the community are shown in Table 1.

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TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR
MISSISSIPPI RIVER at the downstream county boundary	717,326	775,000	1,025,000	1,140,000
DITCH NO. 1 just upstream of the confluence of Ditch No. 2	19.62	N/A	N/A	1,729
DITCH NO. 2 just upstream of the confluence with Ditch No. 1	28.09	N/A	N/A	1,572
DITCH NO. 4 at the downstream county boundary	19.17	N/A	N/A	1,535
ST. JOHN'S BAYOU MAIN DITCH at the downstream county boundary	53.44	N/A	N/A	6,144
NORTH CUT DITCH just upstream of the confluence of St. John's Bayou Main Ditch	106.59	N/A	N/A	7,265
RAMSEY CREEK DIVERSION CHANNEL just upstream of the confluence with Headwater Diversion Channel	35.6	N/A	N/A	10,940
RAMSEY CREEK just upstream of St. Louis Southwestern Railway	24.8	N/A	N/A	9,466

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the streams were obtained by field surveys. All bridges and culverts were field surveyed to obtain elevation data and structural geometry. Cross sections were located at close intervals upstream and downstream of bridges and culverts to compute significant backwater effects of these structures.

Roughness coefficients (Manning's "n") for the computations were obtained through field investigations. The average roughness coefficients were 0.045 for the main channel and 0.090 for the overbank areas.

Water-surface elevations were developed using the COE HEC-2 computer program (Reference 6).

From these computations, it was determined that shallow flooding (Zone AH) exists in the flood plains surrounding Ditch No. 1, Ditch No. 2, Ditch No. 4, St. John's Bayou Main Ditch, and North Cut Ditch.

The starting water-surface elevations on Ditch Nos. 1, 2, and 4 were obtained by taking the first cross section and discharge, and applying Manning's equation. The starting water-surface elevations on St. John's Bayou Main Ditch and North Cut Ditch were obtained from stage-frequency relationships derived from historical data. The starting water-surface elevations on Ramsey Creek Diversion Channel, Ramsey Creek, and Illmo Branch were computed by the slope-area method.

The water-surface profile for the Mississippi River in Scott County from approximately mile 25.0 to mile 48.0 above the confluence of the Ohio River was obtained from published data by the COE, St. Louis District (Reference 4).

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been drawn.

Areas of the community protected by levees are subject to potential risk due to possible failure or overtopping of the levee. These areas were delineated as Zone B by applying the 100-year elevation determined from the "levee in place" analysis.

Flood elevations in Scott County may be raised by debris blockage of the streams.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations shown on the profiles are, thus, considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

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All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with contour intervals of 5, 10, and 20 feet (References 7-9).

For the streams studied by approximate methods, only the 100-year flood plain boundary was delineated using the Flood Hazard Boundary Map for Scott County (Reference 10).

Some areas of the community that are protected from the 100-year flood by a levee have been delineated as having potential risk due to possible failure or overtopping of the levee during larger floods.

Flood plain boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year flood plain boundary corresponds to the boundary of the areas of special flood hazards (Zone A and numbered A zones). Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights.

Due to the topography of the county, the concept of a floodway was not considered appropriate. Along the Mississippi River, any appreciable encroachment into the Mississippi River flood plain (riverside of the levee) should be avoided since increases in the 100-year flood may affect the integrity of the flood control system. However, since navigation on the Mississippi River is important to the economy of Scott County (as well as to many other areas), land use regulations should allow navigation-related development on the riverside of the levee if it does not affect the integrity of the flood control and navigation system.

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No floodway was delineated for the ditches studied that are subject to shallow flooding because the floodway concept is not valid for areas under shallow flooding.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting Scott County.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the weighted average difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the riverine flooding sources of Scott County are shown on the Flood Profiles and are summarized in Table 2, Flood Insurance Zone Data.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a riverine reach is the weighted average difference between the 10- and 100-year flood water-surface elevations rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code. For example, if the difference between elevations is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

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Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.
Zone AH:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no FHFs are determined.
Zones A11, A15, A16:	Special Flood Hazard Areas inundated by the 100-year flood, with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- and 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and, areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are shown in Table 2, Flood Insurance Zone Data.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Scott County is, for insurance purposes, the principal product of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines for riverine flooding sources show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

Flood Insurance Studies have been published for the City of Commerce, Scott County, Missouri, the City of Sikeston, New Madrid and Scott Counties, Missouri, and the Unincorporated Areas of Alexander County, Illinois (References 11-13). The results of this study are in agreement with the City of Commerce, City of Sikeston, and Alexander County studies.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
MISSISSIPPI RIVER							
REACH 1	0050,0100,0150	−5.3	−1.2	N/A	055	A11	VARIES—SEE MAP
REACH 2	0050	−7.4	−2.2	N/A	075	A15	VARIES—SEE MAP
RAMSEY CREEK DIVERSION CHANNEL							
REACH 1	0028	−8.0	−2.5	N/A	080	A16	VARIES—SEE MAP
RAMSEY CREEK							
REACH 1	0028	−8.0	−2.5	N/A	080	A16	VARIES—SEE MAP
ILLMO BRANCH							
REACH 1	0028	N/A	N/A	N/A	080	A16	VARIES—SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOTT COUNTY, MO
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

MISSISSIPPI RIVER—RAMSEY CREEK DIVERSION CHANNEL—RAMSEY CREEK—ILLMO BRANCH

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Flood Insurance Studies are currently in progress for the City of Scott City, Scott County, Missouri, and the geographic area of Mississippi County, Missouri (References 14 and 15). The results of this study are in agreement with the City of Scott City and Mississippi County studies.

Due to its more detailed analysis, this Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for Scott County (Reference 10).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Old Federal Office Building, Room 300, 911 Walnut Street, Kansas City, Missouri 64106.

8.0 REFERENCES AND BIBLIOGRAPHY

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2. ————, Weather Bureau, Technical Paper No. 40, Rainfall Intensity-Duration-Frequency Curves, Washington, D.C., 1961.

3. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-1 Flood Hydrograph Package, Davis, California, September 1983.

4. ————, St. Louis District, Special Flood Hazard Information Study, Mississippi River, Mile 0.0 to Mile 160.7, February 1978.

5. U.S. Water Resources Council, Bulletin No. 17, Guidelines for Determining Flood Flow Frequency, March 1976.

6. U.S. Army Corps of Engineers, Hydraulic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, March 1982.

7. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 5 feet: Bertrand, Missouri, 1969; Cache, Illinois-Missouri, 1967; Morehouse, Missouri, 1963; Sikeston North, Missouri, 1963; Sikeston South, Missouri, 1963; Thebes Southwest, Missouri-Illinois, 1967; Vanduser, Missouri, 1963; Sikeston North, Missouri, 1963.

8. ————, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 feet: Scott City, Missouri, 1963.

9. ————, 7.5 Minute Series Topographic Map, Scale 1:24000, Contour Interval 20 feet: Thebes, Illinois-Missouri, 1966.

10. Federal Emergency Management Agency, Federal Insurance Administration, Flood Hazard Boundary Map, Scott County, Unincorporated Areas, Missouri, August 1980.

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11. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Commerce, Scott County, Missouri, June 1978.

12. ————, Federal Insurance Administration, Flood Insurance Study, City of Sikeston, New Madrid and Scott Counties, Missouri, April 1977.

13. Federal Emergency Management Agency, Flood Insurance Study, Alexander County, Unincorporated Areas, Illinois, January 1986.

14. ————, Flood Insurance Study, City of Scott City, Scott County, Missouri, in progress.

15. ————, Flood Insurance Study, Mississippi County, Unincorporated Areas, Missouri, in progress.

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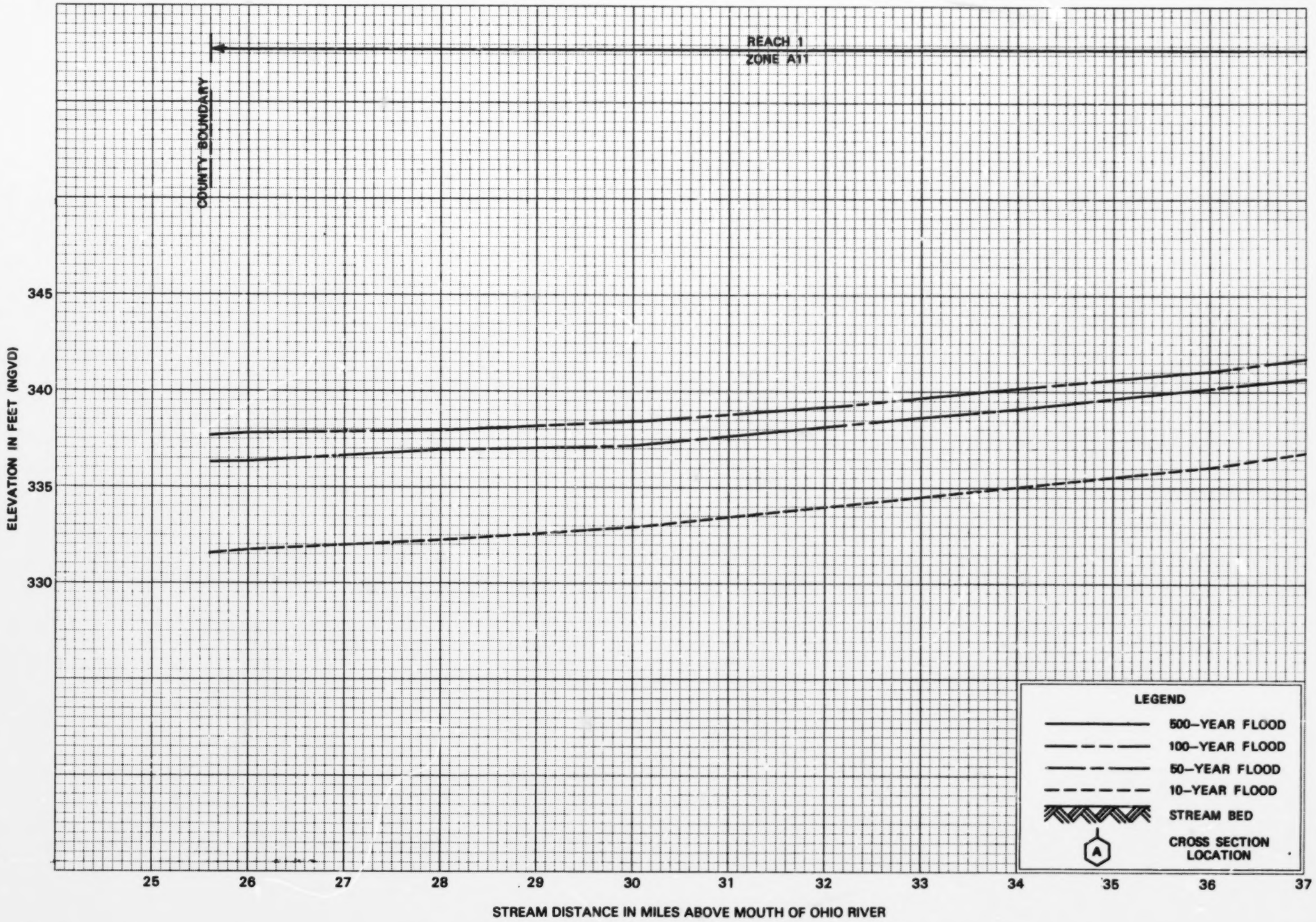

FLOOD PROFILES

MISSISSIPPI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOTT COUNTY, MO
(UNINCORPORATED AREAS)

01P

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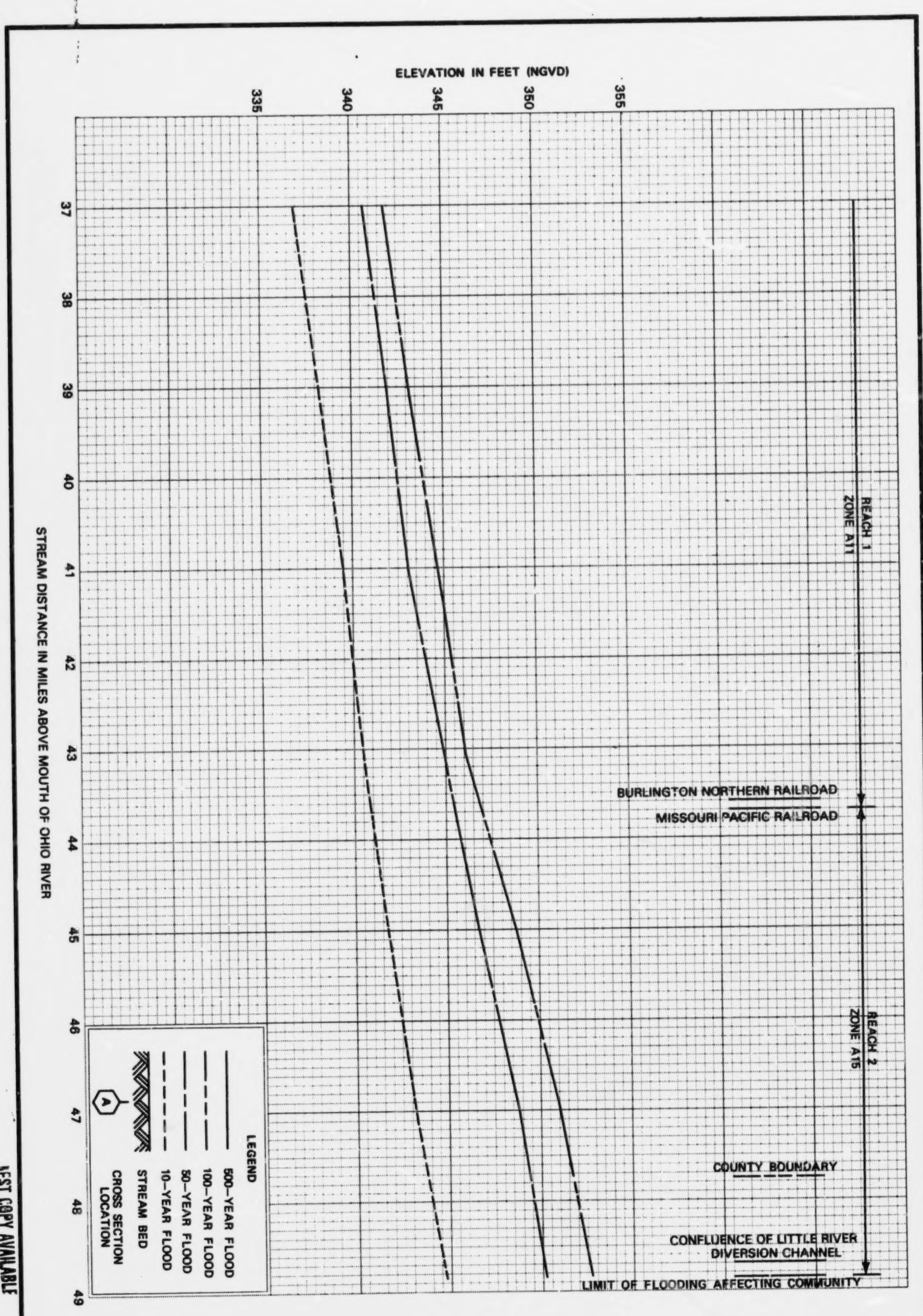

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOTT COUNTY, MO
(UNINCORPORATED AREAS)

FLOOD PROFILES

MISSISSIPPI RIVER

02P

15

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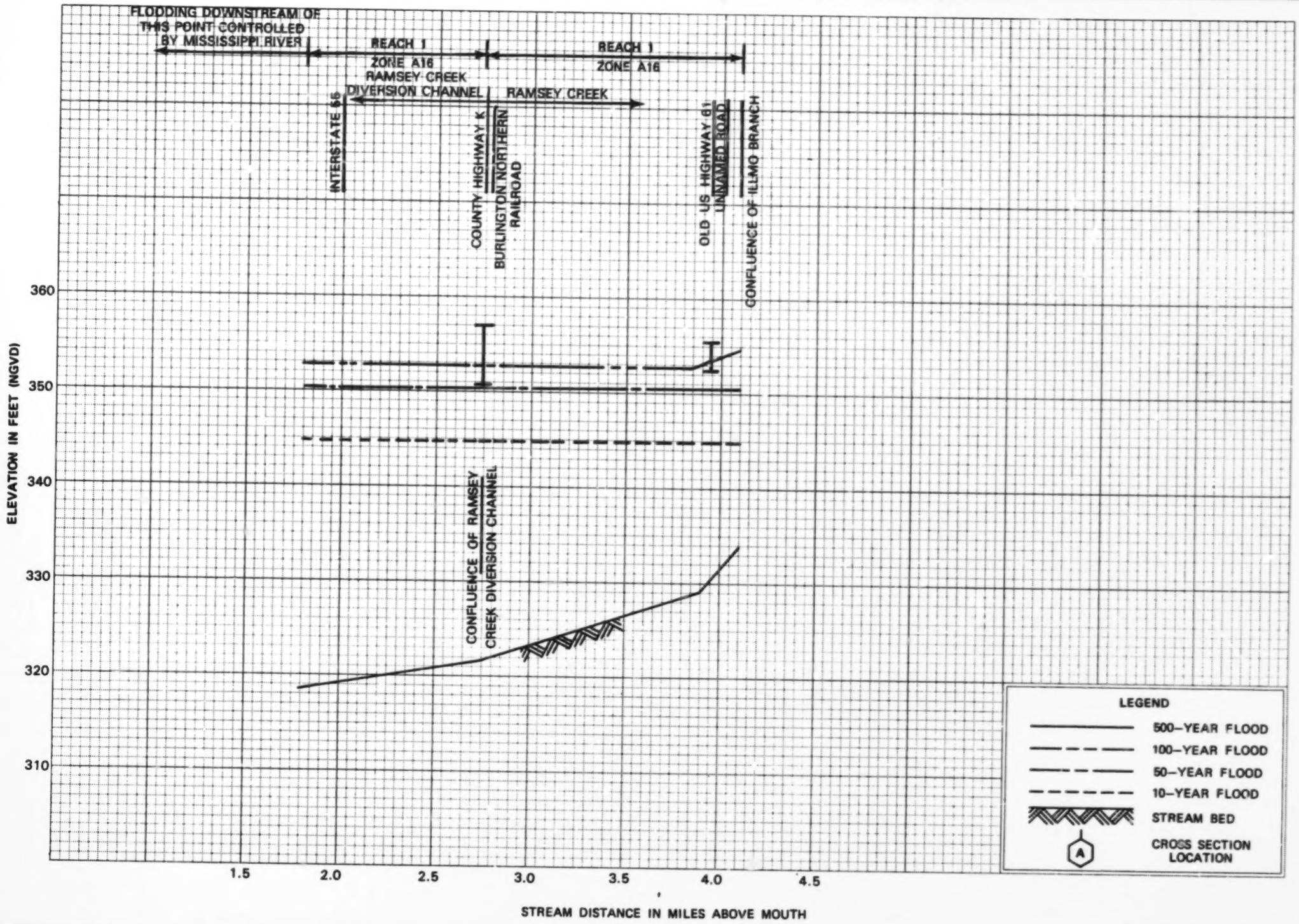

FLOOD PROFILES

RAMSEY CREEK DIVERSION CHANNEL—RAMSEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOTT COUNTY, MO

(UNINCORPORATED AREAS)

03P

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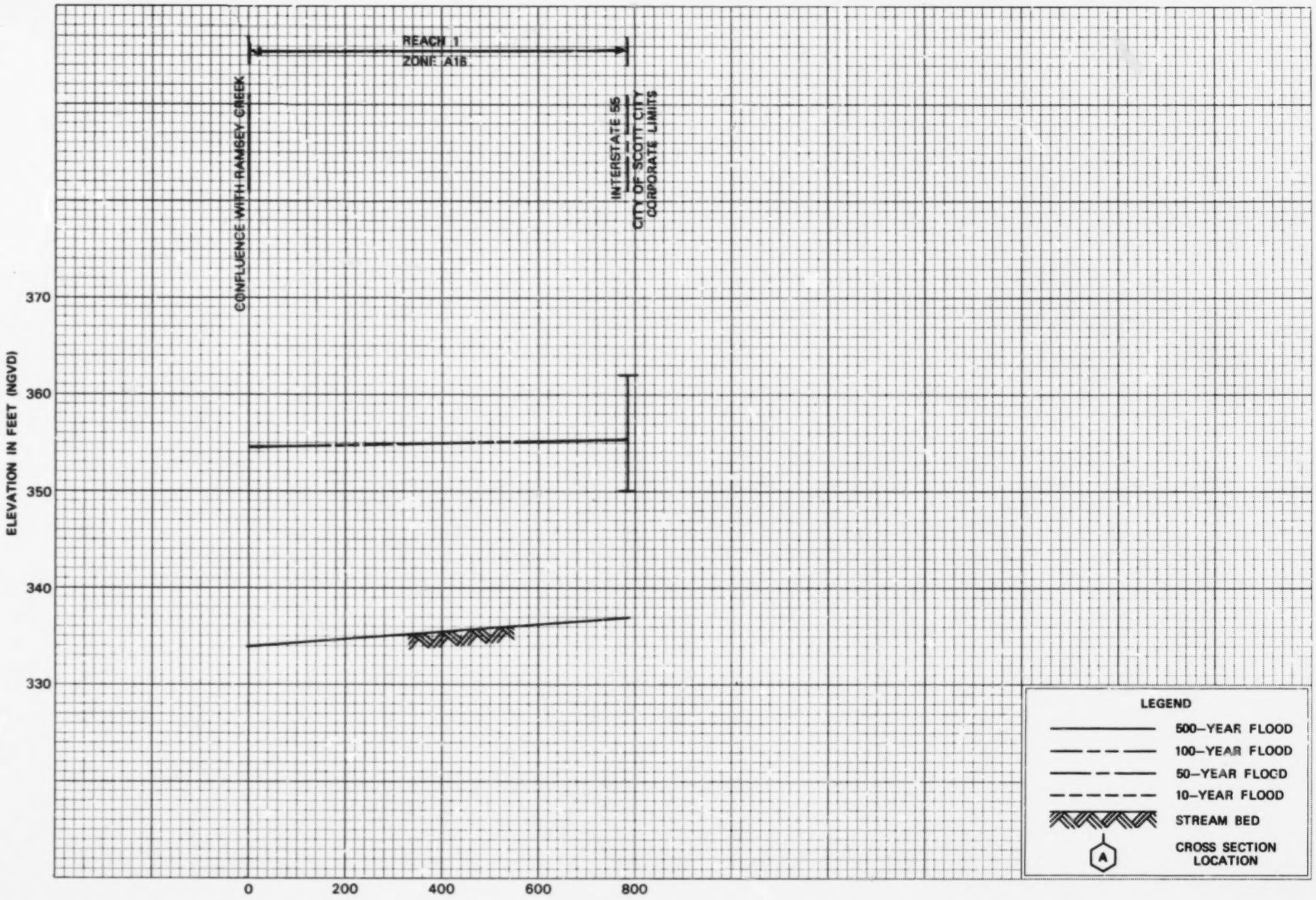

FLOOD PROFILES

ILLMO BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOTT COUNTY, MO
(UNINCORPORATED AREAS)

04P

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